

Contents

Part I Network Structure

| | |
|--|-----|
| Tomography and stability of complex networks <i>Tomer Kalisky, Reuven Cohen, Daniel ben-Avraham, Shlomo Havlin</i> | 3 |
| Spectral analysis of random networks <i>Sergei N. Dorogovtsev, Alexander V. Goltsev, José F. F. Mendes, Alexander N. Samukhin</i> | 35 |
| A tractable complex network model based on the stochastic mean-field model of distance <i>David J. Aldous</i> | 53 |
| The small world phenomenon in hybrid power law graphs <i>Fan Chung, Linyuan Lu</i> | 91 |
| Classes of the shortest pathway structures in scale free networks <i>Kwang-Il Goh, Eulsik Oh, Chul-Min Ghim, Byungnam Kahng, Doochul Kim</i> | 107 |
| The optimal path in an Erdős-Rényi random graph <i>Lidia A. Braunstein, Sergey V. Buldyrev, Sameet Sreenivasan, Reuven Cohen, Shlomo Havlin, H. Eugene Stanley</i> | 129 |
| Clustering in complex networks <i>Gábor Szabó, Mikko Alava, János Kertész</i> | 141 |
| Equilibrium statistical mechanics of network structures <i>Illés Farkas, Imre Derényi, Gergely Palla, Tamás Vicsek</i> | 165 |
| Information theory of complex networks: on evolution and architectural constraints <i>Ricard V. Solé, Sergi Valverde</i> | 191 |

Part II Network Dynamics

| | |
|--|-----|
| Extremal properties of random structures <i>Eli Ben-Naim, Paul L. Krapivsky, Sidney Redner</i> | 213 |
|--|-----|

VIII Contents

| | |
|--|-----|
| On the analysis of backtrack procedures for the colouring of random graphs <i>Rémi Monasson</i> | 237 |
| Small-World synchronized computing networks for scalable parallel discrete-event simulations <i>Hasan Guclu, György Korniss, Zoltán Toroczkai, Mark A. Novotny</i> | 257 |
| Critical phenomena in a small world <i>Matthew B. Hastings, Balázs Kozma</i> | 279 |
| Attacks and cascades in complex networks <i>Ying-Cheng Lai, Adilson E. Motter, Takashi Nishikawa</i> | 301 |

Part III Information Networks & Social Networks

| | |
|---|-----|
| Scholarly information network <i>Paul Ginsparg</i> | 315 |
| Who is the best connected scientist? A study of scientific coauthorship networks <i>Mark E. J. Newman</i> | 341 |
| Information dynamics in the networked world <i>Bernardo A. Huberman, Lada A. Adamic</i> | 375 |
| Emergence of complexity in financial networks <i>Guido Caldarelli, Stefano Battiston, Diego Garlaschelli, Michele Catanzaro</i> 403 | |
| Topology, hierarchy, and correlations in internet graphs <i>Romualdo Pastor-Satorras, Alexei Vázquez, Alessandro Vespignani</i> | 429 |

Part IV Biological Networks

| | |
|--|-----|
| Characteristics of biological networks <i>Albert-László Barabási, Zoltán N. Oltvai, Stefan Wuchty</i> | 447 |
| Boolean modeling of genetic regulatory networks <i>Réka Albert</i> | 463 |
| Theoretical neuroanatomy: analyzing the structure, dynamics and function of neuronal networks <i>Anil K. Seth, Gerald M. Edelman</i> | 487 |